July 18, 2002

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Your Reference: PCT/CA02/00290
Our Reference: 12800-2/PMdC

By Fax (original by mail)
(011 41 22 740 14 35)

AMENDMENT UNDER ARTICLE 19

International Bureau of WIPO
34, chernin des Colombettes
1211 Geneva 20, Switzerland

Dear Sirs:

Re: PCT Application No. PCT/CA02/00290
For: HEAT ENGINE WITH HYDRAULIC OUTPUT
International Filing Date: March 7, 2002
Applicant: Wayne Ernest Conrad

In response to the International Search Report, the applicant provides herewith amended claims 1 – 20.

Yours truly,

Philip C. Mendes da Costa
/kp
Encls.

INTERNATIONAL SEARCH REPORT

nal Application No
PCT/CA 02/00290

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 F02G1/043

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 F02G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 638 633 A (OTTERS JOHN L) 27 January 1987 (1987-01-27) figures 1-3 abstract	1-3,7-17
A	column 11, line 1 - line 68	18-20
X	GB 1 581 748 A (ATOMIC ENERGY AUTHORITY UK) 17 December 1980 (1980-12-17) figures 1-5 page 2, line 1-38 page 2, line 67 - line 111	1-3,5
A		4,16-20
A	WO 01 02715 A (ARTEMIS INTELLIGENT POWER LTD ;SALTER STEPHEN HUGH (GB); RAMPEN WI) 11 January 2001 (2001-01-11) figure 1 abstract claims 1-25	1,2,5,6, 16-20

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17 June 2002	24/06/2002

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Wassenaar, G

Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 608 311 A (ROESEL JOHN F JR) 28 September 1971 (1971-09-28) figures 1-4 abstract column 5, line 1 - line 46 column 6, line 1 - line 50	1-3

INTERNATIONAL SEARCH REPORT

...nal Application No
PCT/CA 02/00290

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4638633 A	27-01-1987	EP 0220622 A2	06-05-1987
		US 4723410 A	09-02-1988
		US 4722188 A	02-02-1988
GB 1581748 A	17-12-1980	IN 145852 A1	06-01-1979
		IN 145853 A1	06-01-1979
WO 0102715 A	11-01-2001	AU 5556500 A	22-01-2001
		EP 1194688 A1	10-04-2002
		WO 0102715 A1	11-01-2001
US 3608311 A	28-09-1971	CA 920374 A1	06-02-1973
		GB 1335419 A	31-10-1973

I Claim:

1. A heat engine having a region within which a working fluid travels and an output system including a chamber having a liquid inlet and a liquid outlet, whereby the heat engine produces power which is used to sequentially draw liquid into the inlet to the chamber and to then pump the liquid out of the outlet.

2. The heat engine as claimed in claim 1 wherein the chamber is open to the region within which a working fluid travels whereby the working fluid directly contacts the liquid to pump the liquid.

3. The heat engine as claimed in claim 1 wherein the liquid is silicone oil.

4. The heat engine as claimed in claim 1 wherein the flow of liquid into and out from the reservoir is tangential.

5. The heat engine as claimed in claim 1 wherein the chamber is a liquid reservoir and the flow of liquid into the reservoir is tangential and the flow of liquid out from the reservoir is axial.

6. The heat engine as claimed in claim 1 wherein the chamber is a liquid reservoir and the flow of liquid into the reservoir is axial and the flow of liquid out from the reservoir is tangential.

7. The heat engine as claimed in claim 1 wherein the chamber is a liquid reservoir, the liquid travels in a circuit and the working fluid and the liquid are each pressurized to a pressure above atmospheric pressure.

8. The heat engine as claimed in claim 1 wherein the chamber is a liquid reservoir, the liquid travels in a circuit and the working fluid and the liquid are each pressurized which is greater than atmospheric pressure.

9. The heat engine as claimed in claim 1 wherein the liquid travels through a circuit that includes an accumulator positioned upstream and downstream from a fluid driven motor.

10. The heat engine as claimed in claim 9 wherein the fluid driven motor has a rotary output.

11. The heat engine as claimed in claim 10 wherein the accumulators and the fluid driven motor are integrated into a single housing to thereby provide a rotary output system which employs fluid seals and does not require gas seals.

12. The heat engine as claimed in claim 1 wherein the sealed region has a heating chamber and a cooling chamber and the liquid travels through a circuit that includes a heat exchange portion exterior to the cooling chamber whereby the liquid is employed to remove heat from the cooling chamber.

13. The heat engine as claimed in claim 12 wherein the circuit that includes an accumulator positioned upstream and downstream from a fluid driven motor and the heat exchange portion is part of a single flow line.

14. The heat engine as claimed in claim 1 wherein the liquid travels through a circuit that includes an accumulator positioned upstream and downstream from a fluid driven motor and a radiator is provided in the circuit to remove excess heat from the engine.

15. The heat engine as claimed in claim 14 wherein the radiator is positioned downstream of the reservoir

16. A heat engine having a region within which a working fluid travels and a heat source, the region has a heating chamber and a cooling chamber, the heat source is thermally connected to the heating chamber, and louvred fins are positioned in the heating chamber whereby the louvred

fins transfer heat from the heat source to the working fluid as the working fluid travels through the louvred fins.

17. A heat engine having a region within which a working fluid travels and a combustion chamber, the region has a heating chamber and a cooling chamber and an outer wall, the combustion chamber is thermally connected to the heating chamber, and a heat exchanger provided exterior to a portion of the outer wall, the heat exchanger having first and second annular fluid flow passageways, each passageway has an outer wall secured in place by mechanical engagement by a plurality of spaced apart fins that extend across the respective fluid flow passageway.

18. An hydraulic pump in fluid flow communication with a heat engine to be driven by a periodic pulse produced by the heat engine wherein the fluid travels through a path that includes a reservoir and the flow of fluid into the reservoir is axial and the flow of fluid out from the reservoir is tangential.

19. An hydraulic pump in fluid flow communication with a heat engine to be driven by a periodic pulse produced by the heat engine wherein the fluid travels through a path that includes a reservoir and the flow of fluid into and out from the reservoir is tangential.

20. An hydraulic pump in fluid flow communication with a heat engine to be driven by a periodic pulse produced by the heat engine wherein the fluid travels through a path that includes a reservoir and the flow of hydraulic fluid into the reservoir is tangential and the flow of hydraulic fluid out from the reservoir is axial.